

CLAIMS

What is claimed is:

1 1. A method of delivering a particle to a mammal comprising the steps of:
2 contacting a functionalized particle with a tag; and
3 introducing the functionalized and tagged particle to a mammal,
4 wherein the functionalized portion of the particle is selected from the group
5 consisting of acrylic acid, 2-hydroxyethyl acrylate, 2-acrylamido-2-methyl-1-propanesulfonic
6 acid, allylamine, carboxyl group, hydroxyl group, sulfonic group, aldehyde group and amine
7 group, and wherein the particle is a biodegradable or nodegradable polymer and less than 1.0
8 mm in diameter.

1 2. The method of claim 1, wherein the functionalized particle is a polymer
2 selected from the group consisting of polyelectrolyte, hydroxypropyl cellulose, N-
3 isopropylacrylamide, and hyaluronan.

1 3. The method of claim 1, wherein the tag is selected from the group consisting
2 of drug, antibody, ligand, antigen, protein, peptide, nucleic acid sequence, fatty acid moiety,
3 carbohydrate moiety, label, light-emitting species, radioactive species, nuclear species,
4 contrast agent, and combinations thereof.

1 4. The method of claim 1, wherein the particle is protective, diagnostic, or
2 therapeutic for one or more diseases selected from the group consisting of the eye, liver,
3 brain, pancreas, spleen, kidney, and lung.

1 5. A method of using a functionalized particle to treat a patient in need thereof
2 comprising the step of:

3 introducing the functionalized particle to the patient,

4 wherein the functionalized portion of the particle is selected from the group
5 consisting of acrylic acid, 2-hydroxyethyl acrylate, 2-acrylamido-2-methyl-1-propanesulfonic
6 acid, allylamine, carboxyl group, hydroxyl group, sulfonic group, aldehyde group and amine
7 group, wherein the particle is a biodegradable or nodegradable polymer and less than 1.0 mm
8 in diameter, and wherein the functionalized particle is introduced to the patient intraocularly,
9 by injection, or by mouth.

1 6. The method of claim 5, wherein the functionalized particle is a polymer
2 selected from the group consisting of polyelectrolyte, hydroxypropyl cellulose, N-
3 isopropylacrylamide, and hyaluronan.

1 7. The method of claim 5, wherein the functionalized particle is further modified
2 with a tag selected from the group consisting of drug, antibody, ligand, antigen, protein,
3 peptide, nucleic acid sequence, fatty acid moiety, carbohydrate moiety, label, light-emitting
4 species, radioactive species, nuclear species, contrast agent and combinations thereof.

1 8. The method of claim 5, wherein the functionalized particle is less than 700
2 nm.

1 9. A functionalized particle comprising:

2 a functionalized particle, wherein the functionalized portion of the particle is selected
3 from the group consisting of acrylic acid, 2-hydroxyethyl acrylate, 2-acrylamido-2-methyl-1-
4 propanesulfonic acid, allylamine, carboxyl group, hydroxyl group, sulfonic group, aldehyde
5 group and amine group, and wherein the particle is a biodegradable or nodegradable polymer
6 and less than 1.0 mm in diameter; and

7 a tag contacting the functionalized particle.

1 10. The functionalized particle of claim 9, wherein the tag is selected from the
2 group consisting of drug, antibody, ligand, antigen, amino acid sequence, nucleic acid
3 sequence, fatty acid moiety, carbohydrate moiety, label, light-emitting species, radioactive
4 species, nuclear species, contrast agent, and combinations thereof.

1 11. The functionalized particle of claim 9, wherein the particle is for a patient in
2 need thereof for diagnosis, prevention or treatment.

1 12. The functionalized particle of claim 9, wherein the functionalized particle is a
2 polymer selected from the group consisting of polyelectrolyte, hydroxypropyl cellulose, N-
3 isopropylacrylamide, and hyaluronan.

1 13. A method of enhancing delivery of a particle to the posterior portion of the
2 eye, comprising the steps of:

3 preparing an ocular particle comprising a functionalized particle, wherein the
4 functionalized portion of the particle is selected from the group consisting of acrylic acid, 2-
5 hydroxyethyl acrylate, 2-acrylamido-2-methyl-1-propanesulfonic acid, allylamine, carboxyl
6 group, hydroxyl group, sulfonic group, aldehyde group and amine group, and wherein the
7 particle is a biodegradable or nodegradable polymer and less than 1.0 mm in diameter; and
8 introducing the ocular particle to a patient in need thereof.

1 14. The method of claim 13, wherein the ocular particle is introduced
2 intraocularly, by injection, or by mouth.

1 15. The method of claim 13, wherein the ocular particle further comprises a tag
2 selected from the group consisting of drug, antibody, ligand, antigen, protein, peptide,
3 nucleic acid sequence, fatty acid moiety, carbohydrate moiety, label, light-emitting species,
4 radioactive species, nuclear species, contrast agent and combinations thereof.

1 16. The method of claim 13, wherein the functionalized particle is a polymer
2 selected from the group consisting of polyelectrolyte, hydroxypropyl cellulose, N-
3 isopropylacrylamide, and hyaluronan.

1 17 A method of crossing a physiologic barrier with a functionalized particle
2 comprising the steps of:

3 contacting the functionalized particle with a tag, wherein the functionalized portion of
4 the particle is selected from the group consisting of acrylic acid, 2-hydroxyethyl acrylate, 2-
5 acrylamido-2-methyl-1-propanesulfonic acid, allylamine, carboxyl group, hydroxyl group,
6 sulfonic group, aldehyde group and amine group, and wherein the particle is a biodegradable
7 or nodegradable polymer and less than 1.0 mm in diameter; and

8 administering the functionalized particle to a mammal, wherein the functionalized
9 particle is capable of crossing the physiologic barrier and exerts an effect.

1 18. The method of claim 17, wherein the tag is selected from the group consisting
2 of drug, antibody, ligand, antigen, protein, peptide, nucleic acid sequence, fatty acid moiety,
3 carbohydrate moiety, label, light-emitting species, radioactive species, nuclear species,
4 contrast agent, and combinations thereof.

1 19. The method of claim 17, wherein the functionalized particle is a polymer
2 selected from the group consisting of polyelectrolyte, hydroxypropyl cellulose, N-
3 isopropylacrylamide, and hyaluronan.

1 20. The method of claim 17, wherein the effect is selected from the group
2 consisting of diagnostic, therapeutic, protective and preventative.

1 21. The method of claim 17, wherein administering is selected from the group
2 consisting of intraocularly, by injection, or by mouth.

1 22. The method of claim 17, wherein the functionalized particle is less than 700
2 nm.

1 23. A method of crossing a physiologic barrier with a functionalized particle
2 comprising the steps of:

3 preparing a functionalized N-isopropylacrylamide particle with a tag, wherein the
4 functionalized portion of the particle is selected from the group consisting of acrylic acid, 2-
5 hydroxyethyl acrylate, 2-acrylamido-2-methyl-1-propanesulfonic acid, allylamine, carboxyl
6 group, hydroxyl group, sulfonic group, aldehyde group, and amine group, and wherein the
7 particle is less than 1.0 mm in diameter; and

8 administering the functionalized N-isopropylacrylamide particle, wherein the
9 functionalized N-isopropylacrylamide particle is capable of crossing the physiologic barrier
10 and exerts an effect.

1 24. The method of claim 23, wherein the tag is selected from the group consisting
2 of drug, antibody, ligand, antigen, protein, peptide, nucleic acid sequence, fatty acid moiety,
3 carbohydrate moiety, label, light-emitting species, radioactive species, nuclear species,
4 contrast agent, and combinations thereof.

1 25. The method of claim 23, wherein the effect is selected from the group
2 consisting of diagnostic, therapeutic, protective and preventative.

1 26. The method of claim 23, wherein administering is selected from the group
2 consisting of intraocularly, by injection, or by mouth.

1 27. The method of claim 23, wherein the functionalized N-isopropylacrylamide
2 particle is less than 700 nm.